

## CLAIMS

### *What is claimed is:*

1. A method for forming a dual damascene interconnect in a dielectric, comprising:
  - 5 etching a first aperture in the dielectric;
  - forming a poison barrier layer over part of the dielectric, which prevents resist poisoning;
  - forming a patterned mask over the poison barrier layer; and
  - 10 etching a second aperture into the low-K dielectric layer, wherein at least part of the first aperture shares the same area as at least part of the second aperture.
2. The method, as recited in claim 1, wherein one aperture is within another aperture.
- 15 3. The method, as recited in claim 1, wherein the first aperture is a via and the second aperture is a trench wherein the via is within the trench.
4. The method, as recited in claim 3, wherein the forming the poison barrier layer comprises plasma treating surfaces of the first aperture to neutralize  
20 nitrogen on the surfaces of the first aperture.
5. The method, as recited in claim 4, wherein the plasma treating oxidizes the surfaces of the first aperture to prevent nitrogen from diffusing out to poison the resist.

6. The method, as recited in claim 1, wherein the forming of the poison barrier layer comprises chemically treating surfaces of the first aperture to provide an  $H^+$  rich surface.

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7. The method, as recited in claim 6, wherein the chemically treating comprises providing a wet chemical treatment with a solution with a pH of less than 7.

8. The method, as recited in claim 1, wherein the forming of the poison barrier layer comprises forming a nitrogen free barrier over surfaces of the first aperture.

9. The method, as recited in claim 1, wherein the forming of the poison barrier layer comprises forming a nitrogen free silicon oxide layer.

10. The method, as recited in claim 1, wherein the dielectric is a low-K dielectric.

11. The method, as recited in claim 10, further comprising the step of placing a copper diffusion barrier layer over surfaces of the first aperture and second aperture.

12. The method, as recited in claim 11, further comprising filling the first aperture and second aperture with copper.

13. The method, as recited in claim 12, wherein one aperture is within another aperture.

5 14. The method, as recited in claim 12, wherein the first aperture is a via and the second aperture is a trench, wherein the via is within the trench.

10 15. The method, as recited in claim 14, wherein the forming the poison barrier layer comprises plasma treating surfaces of the first aperture to neutralize nitrogen on the surfaces of the first aperture.

15 16. The method, as recited in claim 15, wherein the plasma treating oxidizes the surfaces of the first aperture to prevent nitrogen from diffusing out to poison the resist.

20 17. The method, as recited in claim 12, wherein the forming of the poison barrier layer comprises chemically treating surfaces of the first aperture to provide an  $H^+$  rich surface.

25 18. The method, as recited in claim 17, wherein the chemically treating comprises providing a wet chemical treatment with a solution with a pH of less than 7.

19. The method, as recited in claim 12, wherein the forming of the poison barrier layer comprises forming a nitrogen free barrier over surfaces of the first aperture.

20. The method, as recited in claim 12, wherein the forming of the poison barrier layer comprises forming a nitrogen free silicon oxide layer.

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